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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
PADGETT, MARIANNE L	
ART UNIT	**PAPER NUMBER**
1762	

DATE MAILED: 03/17/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/789,020	SIEGEL, STEPHEN B.	
	Examiner	Art Unit	
	Marianne L. Padgett	1762	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *2/2/2006 & 2/24/2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-6,10-14,16,18 and 22-24* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-6,10-14,16,18 and 22-24* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *2/2/06, 2/24/06*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 2/24/2006 has been entered.

Applicant's amendments have maintained the clarification of 112 issues as discussed in the 12/23/2005 advisory, and have also clarified the issues on intent discussed in the advisory, i.e. that the intensity from the LED arrays, is substantially constant for a particular set of curing operations for a particular composition.

It is noted that on very close examination, the "s" on the ends of "product", "article", or "object" in claim 1, line 15 have been deleted by strike through, however as they are barely visible it is difficult to see. Such deletions should be made by double bracketing, so that they are unambiguous.

2. The IDS of February 2 & 24th, 2006 are made of record, however it is noted that for the three Japanese patent publications cited only the English abstract was supplied with NO Japanese patent document, hence these citations properly along under the other art-literature documents.

3. The disclosure is objected to because of the following informalities: it is noted that discussion of figure 4 on pages 7-8 refers to "eccentric cams 50 and 52", etc., however review of the actual fig. 4 shows no reference numeral "52", but reference numerals 50 & 53. The specification is therefore objected to for failing to describe reference 53, but describing reference 52, which does not exist in the figure.

On page 8, fourth full paragraph note the contradictory teaching of "non-oxygen-containing gas, e.g., carbon dioxide", which is confusing and scientifically incorrect, because CO_2 clearly contains oxygen.

Appropriate correction is required.

4. Claims 1-6, 10-14, 16, 18 & 22-24 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claim 1, line 10 (& last) it is uncertain what "equally at the same constant intensity" (emphasis added) is supposed to add to the meaning of the claims that was not already required in line 5 where "emitting UV light at a substantially constant intensity from arrays of UV... (LED) chips..." was introduced. What exactly are "equally" and "same" supposed to modify? The intensity is already required to be constant, hence equally and same appear to be redundant synonyms of constant. The examiner suspects that this is not the intent, but it is not clear from the phrasing exactly what equally or same are intending to further modify. Same as what? If an intensity is constant, it can't be anything other than the same intensity, or it would not be constant. If applicant's intent is to emphasize that the constant intensity is maintained, it would be better/clearer to say so plainly and indicate timing/duration of the maintenance and/or means of maintaining (would be consistent with claim 6 or teachings on pages 9, 13-14). "Equally" due to the phraseology, could be modifying intensity, or ink, or surfaces. Assuming that it is intended to describe how the emitted UV light is being applied to the ink printed surfaces, the use of "equally" is similar to the previously claimed "uniformly", but appears to been placed in a different part of the phrasing in an attempt to give it a more precise meaning. Would phrasing such as --applying, distributing or sweeping the UV light emitted from the UV LED chips, so the UV light equally irradiates the surface printed with the UV particular curable ink... facing the LED chips...-- (underlining added for emphasis) provide intended & supported meaning? Note that lines 5-6 already require the light from the chip arrays to be "substantially constant intensity", especially if proper antecedences is shown through use of "the" or "said". In independent claim 13, lines 8-12 have analogous uncertainty.

5. Claims 1-6, 10-14, 16, 18 & 22-24 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter, which

was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Support for the new language of "equally at the same constant intensity on the particular UV curable ink printed on the surfaces" and "curing the particular UV curable ink to produce an identical degree of polymerization on each printed UV curable product[s]..." is not unambiguously clear from the specification. For the first phrase this is partially due to the lack clarity as discussed above, but also while there are discussions of constant intensity or adjusting intensity of the LEDs (p. 9 & 13-14), it is not specifically related to the printed surfaces. The teachings of uniform application (e.g. equally) found on p.7, 9-10, etc. are specifically related to use of motion, such as oscillation, or configuration of LEDs, as well as the control of the LEDs temperature in order to maintain the intensity, in order to affect the distribution of light, however none of these were found to actually be taught specifically to be related to producing "an identical degree of polymerization on each printed UV curable..." The examiner will agree, that if one keeps all photocuring conditions identical, which includes constant intensity with identical applied doses of radiation, one will inherently have identical degrees of polymerization, so one could say that the limitation is inherently supported, but the claims do not actually necessitate that ALL conditions are maintained for every cured product, etc., so one really does need to have a teaching supporting these limitations, or a clear explanation on the record of why the original teachings in the specification support these amendments. The examiner does agree that it would be clear to one of ordinary skill that the more completely one can identically and constantly maintain one's curing conditions, inclusive of intensity from the LED arrays and even distribution of that constant intensity light onto the surface being cured, the more reproducibly one can identically cure to the same degree of polymerization each surface treated. This is a very old and well-known concept, but obviousness is not proper support for limitations that are not actually found discussed in the specification, so applicant should point out where the specification necessitates the claimed curing results, and how the claims

contain all the critical components to produce the claimed results (or point out where the specification explicitly teaches these results, if the examiner has missed it), or limit the claims to what is actually taught in the specification.

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. Claims 1-6, 10-14,16, 18 & 22-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Young (6,561,640 B1), sections 6 of the 2/1/05 & 8/26/2005 actions, optionally in view of Itou (5,986,682) or Malinen (6,075,595) or Owen et al (2005/0152146 A1, noting provisional parent 60/379,019 with filing date 5/8/2002).

The claims that amended to further emphasize the use of constant intensity from the LED arrays, and what appears to be in intent for the light emitted from the LEDs to be uniformly or equally distributed over the surface being cured in so as to produce identical curing in each printed substrate cured. As previously discussed, while Young does not discuss constant intensity from their light source, exactly how the light is distributed or identical degrees of cure from object to object, it is common practice in most manufacturing settings to strive for reproducible results on an assembly line, such as is taught by Young, hence it remains considered obvious to one of ordinary skill in the art when employing the teachings of Young to use the taught control of intensity to maintain that intensity so as to produce the desired amount of radiation to achieve the taught degree of curing for each step when curing the same composition, as this would be a matter of competent workmanship. While Young teaches that intensity is adjustable, that adjustability is in the context of adjusting the intensity for curing different specific compositions, hence one of ordinary skill would expect a competent practitioner to maintain the optimum intensity throughout a curing process, and there is no suggestion in the reference that one would not do this. Similarly, there is no suggestion in the reference that one would not be curing like materials to a like

degree, and again one of ordinary skill would expect the competent practitioner to be maintaining their conditions, so as to produce the same curing, i.e. reproducible results, with each like article produced or like material cured. The independent claims lack any specific steps or means for producing these commonly expected activities when curing on an assembly line.

The optional secondary references to Itou (5,986,682) or Malinen (6,075,595) or Owen et al (2005/0152146 A1) provide teachings supportive of the above asserted obviousness. Specifically with respect Itou (abstract; figures 6-9, 15, 36; column 12, especially lines 3-10 & 29- 64, particularly discussion of fig. 8; embodiment 2 on column 16), who teaches LED devices for use as light sources used for "fixing light" on recording paper, it is taught for light emitting devices to be placed in a staggered arrangement on an emitting board, such that the quantity of light is uniform in the direction of the width of the recording paper due to the staggering of the rows of LEDs. Itou further notes that the LED support is made so as to dissipate heat, and that one would add a sufficient number of rows of staggered LEDs in order to be able to have sufficient quantity of radiation for fixing on recording media. Itou further teaches the use of a cam to cause reciprocating motion for the emitting board, i.e. LED array panel, and thereby eliminate variation in quantity of light due to clearance between admitting devices. It would have been obvious to one of ordinary skill in the art to use these teachings of Itou when choosing or designing the suggested LED arrays for use in Young, because they are suggested for use in recording on paper, which is analogous that Young was use in printing processes and provide advantages for uniform application of radiation from LED arrays that would've been consistent with the teachings of the primary references and advantageous therein.

Alternately, Malinen (abstract; figures 1 & 2a; column 3, lines 3-22 & 61-67+; column 4, lines 23-55, especially 46-49; column 6, lines 34-51; column 7, lines 50-67) provides teachings to the effect that in LEDs increased temperature can cause decreased intensity and a change of the emitted wavelength, thus provides mechanisms by which the operational temperature of the LED may be maintained during its

use, hence it would've been obvious to one of ordinary skill in the art to control the operational temperature of the LEDs as taught by Malinen for the suggested LED arrays of Young, in order to ensure that the optimum in specified curing wavelength for the multistage curing processes are maintaining, and also as a means of controlling the intensity/amount of specific wavelength irradiation in Young to produce desired degrees of curing. Note as Young's process is dependent on use of specific wavelengths to cure depositions with specific photoinitiators, it would've been a matter of competent workmanship to ensure that the employed LEDs maintained their desired parameters (wavelength, intensity, etc.), thus motivating use of techniques of LED control/maintenance of this secondary reference, to enable the optimum performance of Young's teachings.

Alternately, Owen et al. (abstract; figures 2-6; [0029]; [0032-40]; [0052]; claim 13; or in the provisional see pages 4-7 & 10; figure 1) teach high-efficiency solid-state lighting sources, and that may employed LEDs and may be used for photo polymerization, with discussions of light intensity and spatial uniformity, etc., as required for specific applications. Owen et al. note that the power density output (i.e. intensity) is affected by chip array spacing and density, and teach thermal control of the substrate on which the LED chips are mounted, such as via the use of heatsink with fins and fans, and choice of specific wavelength depending on the specific material transformation desired, which will affect the required power density output. Owen et al. may employ multiple arrays in a module or light bar, where it is taught to move this light source relative to the target or work, such that light uniformity is improved by moving the source, because movement spreads the light output evenly across the work, where various configurations and any motive means necessary to achieve objectives of process are taught to be used. It would've been obvious to one of ordinary skill in the art to apply these concepts to the photo polymerization process of the primary reference for the advantages taught, and because the generically disclosed LED arrays of Young do not provide such details, such that one of ordinary skill would look to known teachings in the art to supply specific details, which Owen et al. provides for analogous uses.

8. Biegelsen et al (6,536,889 B1) remains substantially similar to Young, and may be considered substantially equivalent for the claims, as section 7 of the 2/1/05 action.

9. Claims 3 & 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Young (6,561,640 B1), optionally in view of Itou (5,986,682) or Malinen (6,075,595) or Owen et al as applied to claims 1-6, 10-14,16, 18 & 22-24 above, and further in view of Itou or Ignatius et al. (5,278,432) or Vackier et al. (6,525,752 B2).

Alternately to the above rejection, Itou (discussed above) or Ignatius et al. (abstract; figures 1-2 & 4 column 1, lines 6-10 & 65-column 2, lines 15, 30-49 & 56-column 3, line 5 & 65-67; column 4, lines 13-15 & 48-58; column 5, lines 4-12) or Vackier et al (abstract; figure 1; column 8, lines 3-62; & column 9, lines 39-43) all teach the use of staggered LEDs in LED light sources. With respect to Vackier et al., they teach the arrays may be made up of individually staggered LEDs, and that those arrays themselves are staggered, such that the staggered light sources are thereby focused into a continuous line Vackier L. teach use of this LED array carrier configuration with a print head assembly, hence it would've been obvious to one of ordinary skill in the art to employ LED arrays structured as in Vackier et al. for the generically taught LED arrays of the primary reference, because they are analogous uses, and one would look to known art such as Vackier et al. in order to term and useful structures for the generic disclosure, especially considering the ability to create a continuous line of light would have been expected to be useful and appropriate in the assembly-line type process of Young.

Alternately, Ignatius et al. teach configurations for LED arrays arranged in tightly packed structures, where multiple sets of arrays may be configured together, where the number depends on needs of the specific enduse and the illustrations clearly depict staggering of the LEDs from one row to the next. Ignatius at al teaches that the tight packing is desirable for its effects on the intensity output, and also notes the prayer for bill of the abusing a thermally conductive substrate for the LED arrays so that it may act as a heatsink. While Ignatius et al.'s preferred use for their LED arrays is as a light source for plant

growth or testing, they also teach that their LED arrays may be used for other applications, where the spectral omissions of those arrays would then be selected according to the desired application, hence it would've been obvious to one of ordinary skill in the art to employ LED arrays so configured for their beneficial effects on intensity output, and because the primary reference while teaching use of LED arrays as light sources, does not provide such details so that one of ordinary skill would look to known prior art for construction of taught LED arrays.

10. Other art of interest include two patent application publications to applicant (2005/0104946 A1 & 2005/0222295 A1); Kovac et al (6200134 B1, especially abstract figures 3-4 column 7, lines 39-, line 11+) who illustrates staggered LED arrays and discusses temperature control; Powell et al. (2004/0156130 A1) who uses an array of microlenses to homogenized or affect a substantial uniform intensity from light sources that may be inclusive of LED arrays; and Brukilacchio (2003/0218880 A1) who teach high intensity in spatial human uniformity for a white light LED optical system.

11. Applicant's arguments filed 2/24/2006 & discussed above have been fully considered but they are not persuasive.

Applicant's arguments with respect to claims1-6, 10-14,16, 18 & 22-24 have been considered but are moot in view of the new ground(s) of rejection.

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Marianne L. Padgett whose telephone number is (571) 272-1425. The examiner can normally be reached on M-F from about 8:30 a.m. to 4:30 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Timothy Meeks, can be reached at (571) 272-1423. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

MLP/dictation software

3/8-10/2006

MARIANNE PADGETT
PRIMARY EXAMINER